THE MANY OPEN QUESTIONS WE HAVE ON NEUTRON RADIATION EFFECTS

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E_0

All of the have different E_0 and E_max

LANL has been studying whether E_0 needed to be changed in the JESD89

▪ Many but not all electronics have onsets below 10 MeV, so the fluence is under counted

▪ All of the facilities have too many 1-10 MeV neutrons, so we might overcount fluence if we lower E_0

▪ We did not change it for JESD89B, because the information was contradictory

Open Questions:

▪ Can we make simplifications of the Weibull parameters based on feature size and/or effect?

▪ Can we fix the accelerator spectrum?

▪ Could something like a sensor response function help us out?

▪ Can we predict the error in broad spectrum testing without doing 1-10 MeV mono-energetic neutron testing

▪ Why does 1-10 MeV neutron sensitivities not look like 1-10 MeV proton sensitivities? What to do about the fit?
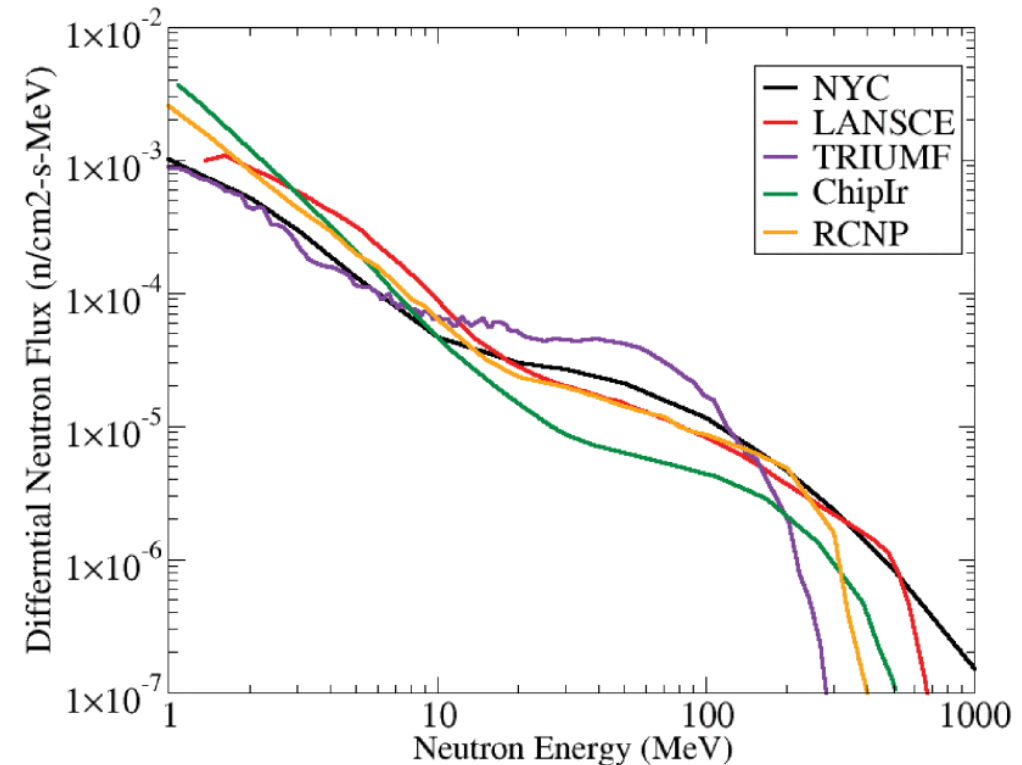
RECOIL BYPRODUCTS

There is very little information about the byproducts of proton and neutron Si interactions (Tang, and Hiemstra)

Open Questions:

- Did we really have enough information from the Tang paper to say that above 50 MeV the reactions are equivalent?

- What are the recoiling heavy ion species and energies based on proton and neutron incident energy?

- Is there some packaging aspect that we are not taking into account that makes 1-50 MeV protons and neutrons reactions different? What is the underlying physics?

DD + SEE

Open Questions:

- Does DD change SEE sensitivities: either increasing or decreasing?
  - The DD should increase the resistivity and might decrease SEL
  - Is that true of all effects?
  - There is some small amount of modeling that shows that SEB is worse under DD. Is that true in the wild?

FINS VS. PLANAR

Open Questions:

- Is there any different in the onset for fin vs. planar?
- Is DD worse in smaller feature sizes?

B10

Open questions:

- How pervasive is it?
- Is there a way to determine how close the B10 needs to be from the sensitive volume?
- How different are the sensitive volumes for the B10 reaction vs. the Si reaction?
- Is there any way to predict this?